

CLAIMS

1. A pressure enclosure, comprising:
 - a pressure chamber having an opening;
 - a first member coupled to the pressure chamber in a position over the opening;
 - a second member positioned between the pressure chamber and the first member and covering the opening; and
 - a load chamber defined by a space between the first and second members, configured such that pressure in the load chamber acting on respective surfaces of the first and second members biases the second member against the pressure chamber over the opening, the load chamber further configured to remain pressurized independent of pressure in the pressure chamber.
2. The pressure enclosure of claim 1 wherein the second member comprises inlet and outlet check valves configured to regulate passage, through the pressure chamber, of a fluid medium to be pressurized.
3. The pressure enclosure of claim 1 wherein the load chamber is in fluid communication with a source of pressure.
4. The pressure enclosure of claim 3 wherein the source of pressure is external to the pressure chamber.
5. The pressure enclosure of claim 4 wherein the source of pressure is independent of pressure from the pressure chamber.
6. The pressure enclosure of claim 5 wherein the load chamber is in fluid communication with the pressure chamber.

7. The pressure enclosure of claim 1 wherein the load chamber is configured such that a pressure in the load chamber of less than around 75% of a pressure in the pressure chamber is sufficient to bias the second member against the pressure chamber to seal the opening.

8. The pressure enclosure of claim 1 further comprising a check valve configured to retain pressure in the load chamber.

9. The pressure enclosure of claim 8, wherein the check valve is internal to the pressure enclosure.

10. The pressure enclosure of claim 8, wherein the check valve is configured to pass a selected proportion of the pressure from the pressure chamber into the load chamber.

11. A pump, comprising:
a cylinder having a bore in which a medium may be pressurized;
a valve body positioned across a first end of the cylinder;
an end cap coupled to the cylinder and positioned over the valve body
such that the valve body is held in position against the cylinder; and
a load chamber defined by a space between the valve body and the end cap, the valve body within the load chamber having a surface area greater than a transverse cross sectional area of the bore of the cylinder, the load chamber configured such that a pressure in the load chamber biases the valve body against the cylinder and forms a static seal therebetween.

12. The pump of claim 11 wherein the surface area of the valve body within the load chamber is at least around 130% of the transverse cross sectional area of the bore of the cylinder.

13. The pump of claim 11 wherein the load chamber is in fluid communication with a source of pressure.

14. The pump of claim 13, further comprising a pressure regulation device between the source of pressure and the load chamber.

15. The pump of claim 11 wherein the load chamber is in fluid communication with the cylinder.

16. The pump of claim 15, further comprising a check valve within the pump, and wherein the load chamber is in fluid communication with the cylinder via the check valve.

17. A pressure device, comprising:
a cylinder;
means for pressurizing the cylinder;
an end cap;
a valve body; and
means for utilizing a medium pressurized to a level of pressure significantly less than a pressure in the cylinder to bias the valve body against the cylinder and maintain a static seal.

18. The pressure device of claim 17 wherein the pressurizing means comprises a plunger in the cylinder.

19. The pressure device of claim 17 wherein the utilizing means comprises a load chamber provided between the valve body and the end cap, and the load chamber is configured to receive the pressurized medium.

20. The pressure device of claim 19 wherein the utilizing means comprises means for regulating the pressure in the load chamber.

21. A system, comprising:
a pump having a pressure output and a load chamber configured to bias a sealing body against a cylinder utilizing a pressure lower than about 75% of a pressure at the pressure output;
means for pressurizing the load chamber;
a power source coupled to the pump; and
a tool having an input coupled to the pressure output.

22. The system of claim 21, further comprising means for regulating the pressurizing means.

23. The system of claim 21 wherein the pressurizing means comprises a pressure source external to the pump and having an output coupled to the load chamber.

24. A method, comprising:
pressurizing an enclosure, the enclosure including an opening, a first member configured to cover the opening, and a second member coupled to the enclosure and configured to maintain the first member in position over the opening; and
sealing the opening of the enclosure by pressurizing an annular space encircling the first member and defined by surfaces of the first and second members, thereby biasing the first member against a mouth of the opening.

25. The method of claim 24 wherein the step of pressurizing the space further comprises passing pressure from the enclosure to the space.

26. The method of claim 25 wherein the step of pressurizing the space further comprises regulating pressure in the space.

27. A pressure enclosure, comprising:
a first component of the pressure enclosure, having an opening;
a second component of the pressure enclosure coupled to the first component in a position over the opening;
a third component having first and second ends, the third component positioned between the first and second components with the first end covering the opening; and
a load chamber positioned between the first and second ends, defined by a space between the second and third components and configured such that a pressure in the load chamber biases the third component against the first component to seal the opening.

28. A pump, comprising:
a first member having a cylindrical bore;
a second member positioned across a first end of the bore;
a static seal positioned between the first and second members and configured to prevent passage of fluid therebetween;
a third member positioned opposite the first member, relative to the second member;
a load chamber positioned between the second and third members and configured to exert a separating bias between the second and third members, thereby biasing the second member against the static seal;
a passage for transmitting pressurized fluid from an output of the bore to the load chamber; and
a check valve in the passage between the load chamber and the bore and internal to the pump, configured to trap pressurized fluid within the load chamber.

29. The pump of claim 28, further comprising a pressure transmitting member positioned within the load chamber and configured to apply biasing force on the second member in response to pressure in the load chamber.

30. The pump of claim 29 wherein the check valve is configured to admit fluid to the load chamber at a selected ratio of a pressure of fluid in the bore.

31. A pump, comprising:
a cylinder in which a medium may be pressurized;
a valve body positioned across a first end of the cylinder;
an end cap coupled to the cylinder and positioned over the valve body such that the valve body is held in position against the cylinder;
an outlet chamber positioned between the end cap and the valve body to collect pressurized fluid from the cylinder;
a discharge line coupled to the outlet chamber and configured to transmit pressurized fluid to a region external to the pump;
a load chamber within the end cap;
a passageway, internal to the pump, extending between the outlet chamber and the load chamber; and
a check valve provided in the passageway.

32. A pump, comprising:
a cylinder;
a valve body positioned across a first end of the cylinder;
a static seal positioned between the valve body and the cylinder and configured to prevent passage of fluid therebetween;
an end cap positioned opposite the cylinder, relative to the valve body;

a load chamber positioned between the end cap and the valve body and configured to exert a separating bias between the end cap and valve body, thereby biasing the valve body against the static seal;

a passage for transmitting pressurized fluid from an output of the cylinder to a region outside the pump; and

a pressure source external to the pump and independent of pressure from the cylinder, configured to pressurize the load chamber.

33. A pump, comprising:

a first member having a cylindrical bore;

a second member coupled to the first member over an end of the bore, the second member including first and second bodies, each having a planar face, the planar faces of the first and second bodies being positioned adjacent to each other;

a static seal between the first member and the second member, configured to prevent leakage of pressurized fluid from the cylindrical bore;

a load chamber comprising first and second cavities formed in the planar faces of the first and second bodies, respectively, the load chamber configured such that pressure in the load chamber biases the first body away from the first member and the second body toward the first member, thereby exerting a compressing bias on the static seal;

an annular sealing member positioned within the load chamber and configured to provide a sealing surface for load chamber seals without transmitting biasing force in an axis parallel to an axis of the cylindrical bore;

an upper load chamber seal positioned between a wall of the first cavity and the annular sealing member; and

a lower load chamber seal positioned between a wall of the second cavity and the annular sealing member.

34. The pump of claim 33, further comprising a pressure transmitting passage passing through a portion of the second member and configured to enable fluid communication between the cylindrical bore and the load chamber.

35. The pump of claim 34, further comprising a check valve in the pressure transmitting passage, configured to admit pressure from the cylindrical bore to the load chamber, and to hold pressure within the load chamber.

36. The pump of claim 33, further comprising a pressure transmitting passage passing through a portion of the second member between a pressure source external to the pump and the load chamber.